Why This Workshop

Session 1.1

Introduction: Background, Motivation and Objectives

The global focus on universal connectivity is driven in part by the fact that, despite the meteoric growth of Internet use and broadband connectivity, 37 per cent of the world's population, or 2.9 billion people, were still offline and excluded from the benefits of the global digital economy at the end 2021. Offline populations are particularly concentrated in least developed countries, where only 27 percent of individuals were online in 2021.

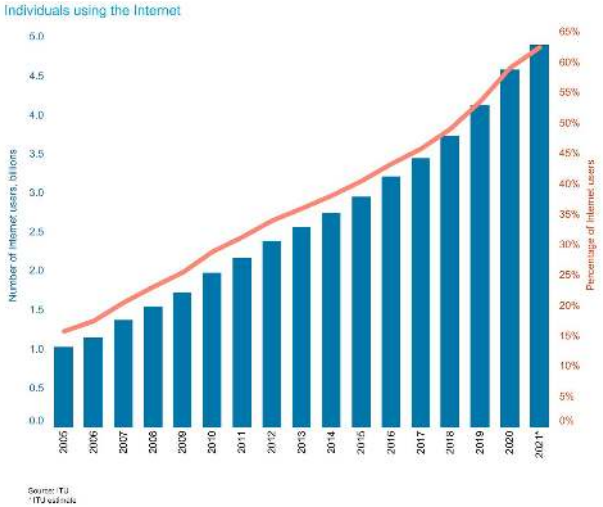
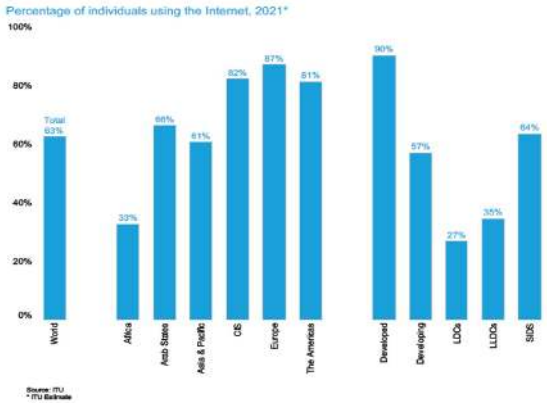
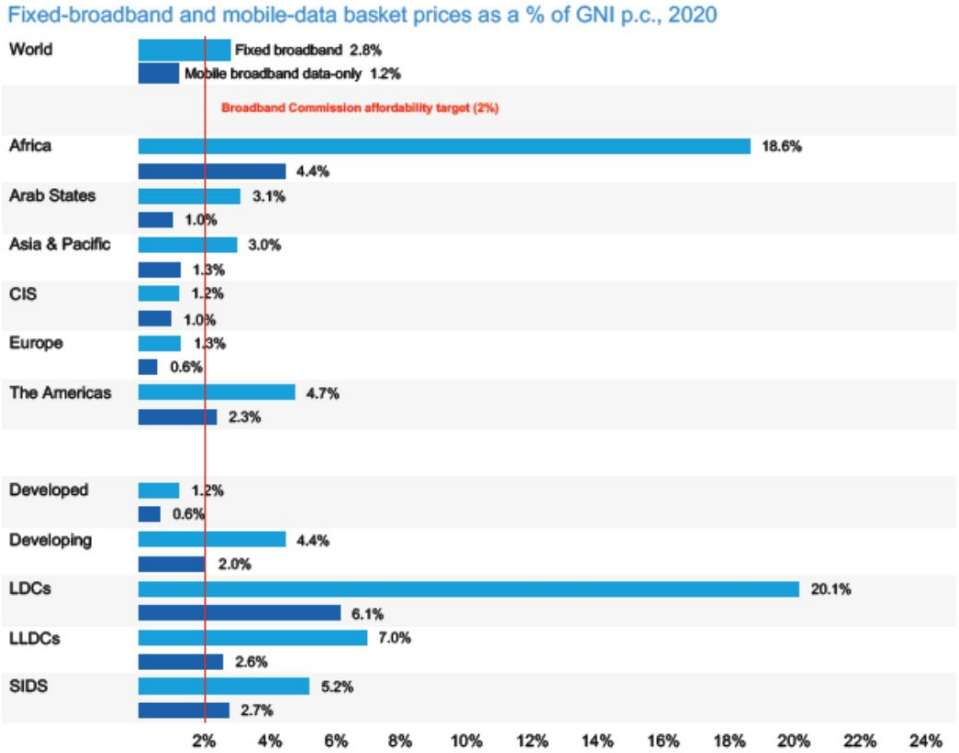


Figure 4: Percentage of individuals using the Internet, by region and development status, 2021



Introduction: Background, Motivation and Objectives



Source: GSMA/ITU

Impact of Covid-19 on Connectivity

Internet traffic volume has grown ~50-60% since pre-pandemic levels

COVID-19 pandemic illuminated a long-standing issue: The many low-income communities around the world that lack reliable and / or affordable access to connectivity are being left further behind.

Impact of Communication Networks

Malaria Journal

BioMed Central

Research

Open Access

Role of information and communication networks in malaria survival

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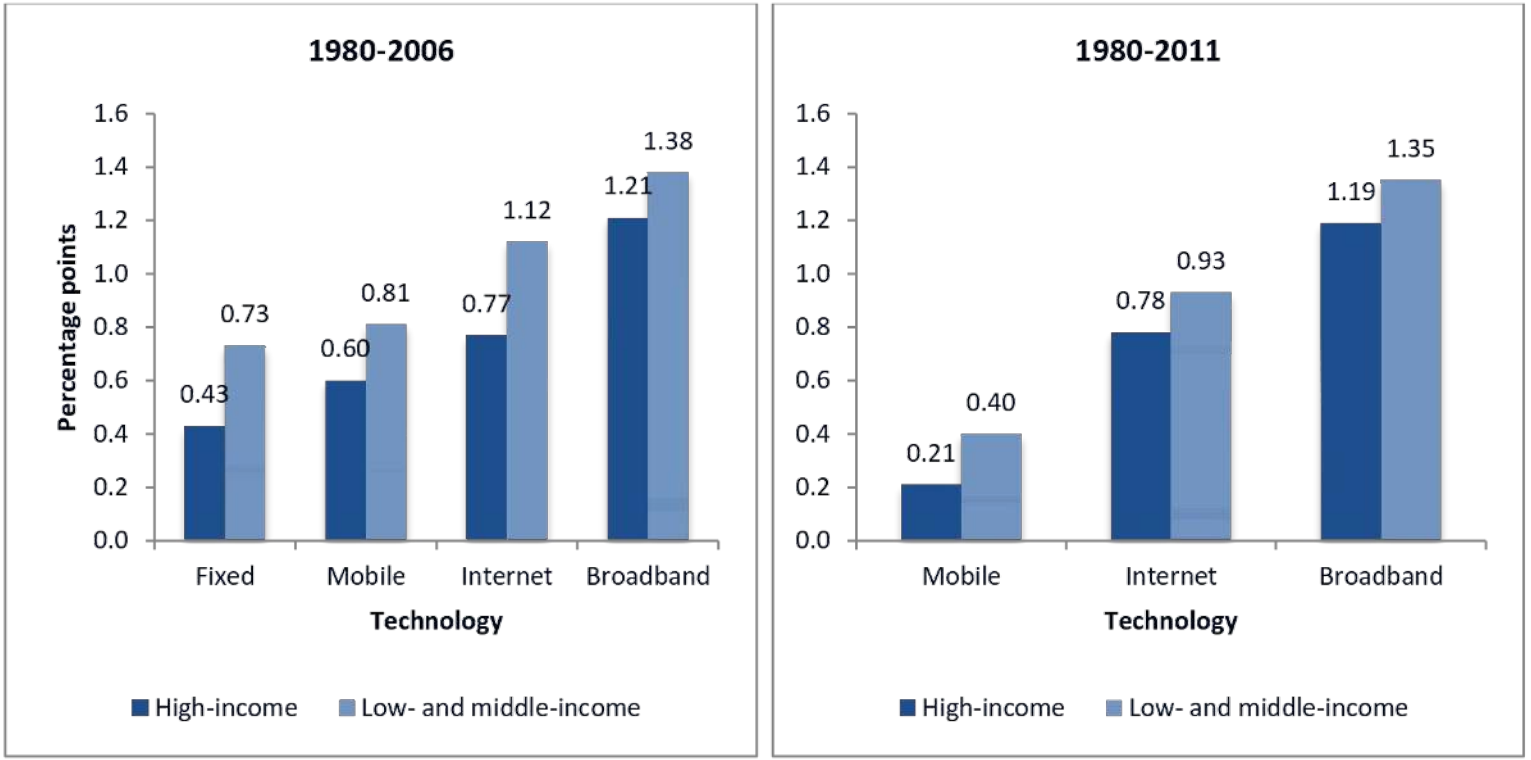
This article is available from: http://www.malariajournal.com/content/6/1/136

Abstract

Background: Quite often symptoms of malaria go unrecognized or untreated. According to the Multilateral Initiative on Malaria, 70% of the malaria cases that are treated at home are mismanaged. Up to 82% of all malaria episodes in sub-Saharan Africa are treated outside the formal health sector. Fast and appropriate diagnosis and treatment of malaria is extremely important in reducing morbidity and mortality.

Simple proximity to communication networks decreases the chance of dying from Malaria

Impact of ICTs on GDP



Source: Qiang et al. 2009 and Scott 2012.

Introduction: Sustainable Development Goals

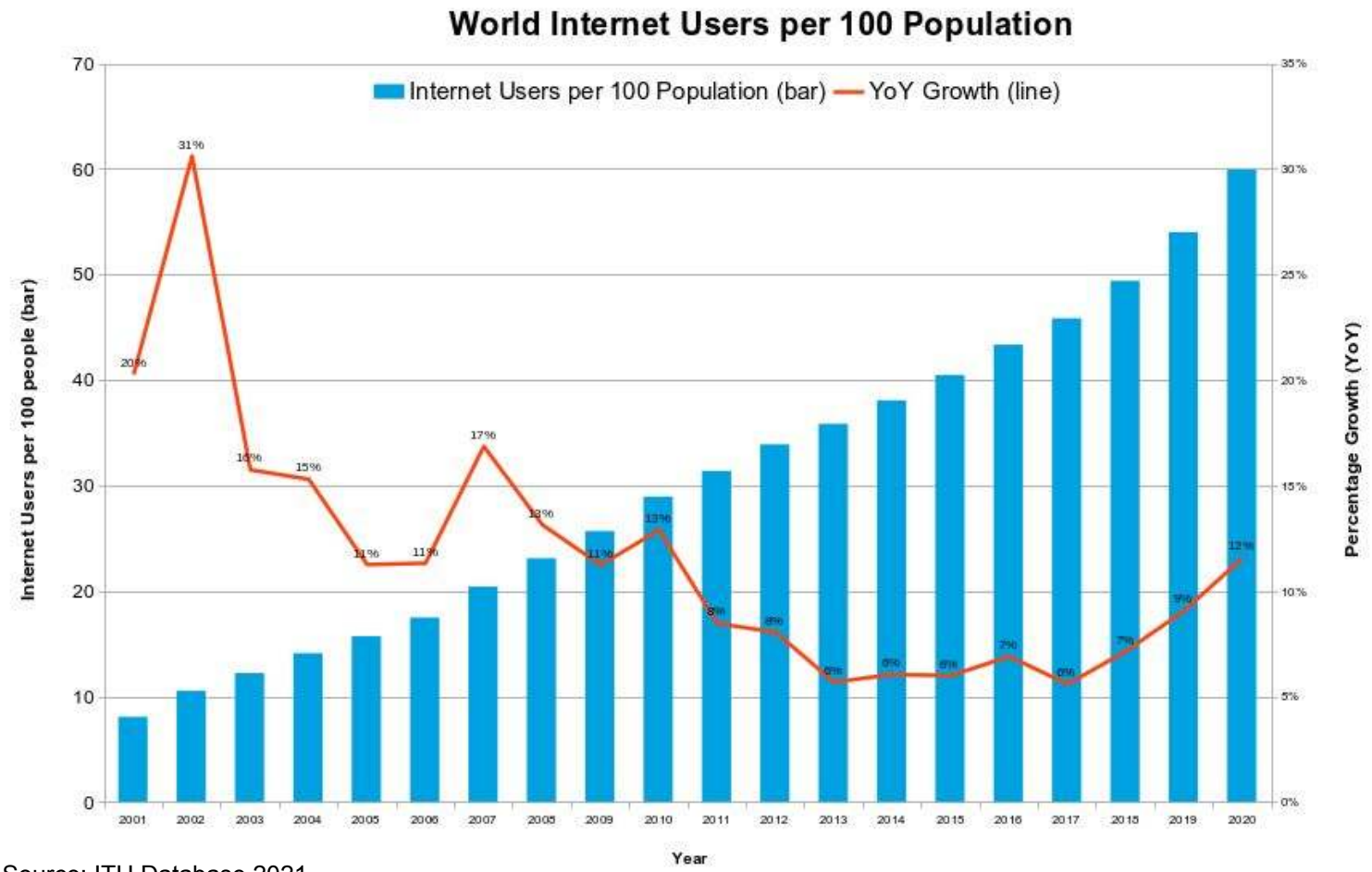
Source: #ICT4SDG: ICT-centric economic growth, innovation and job creation
https://www.itu.int/dms_pub/itu-d/opb/gen/D-GEN-ICT_SDGS.01-2017-PDF-E.pdf

Universal and affordable access

Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation

9.C Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020

Source: https://www.un.org/sustainabledevelopment/infrastructure-industrialization/



Source: ITU Database 2021

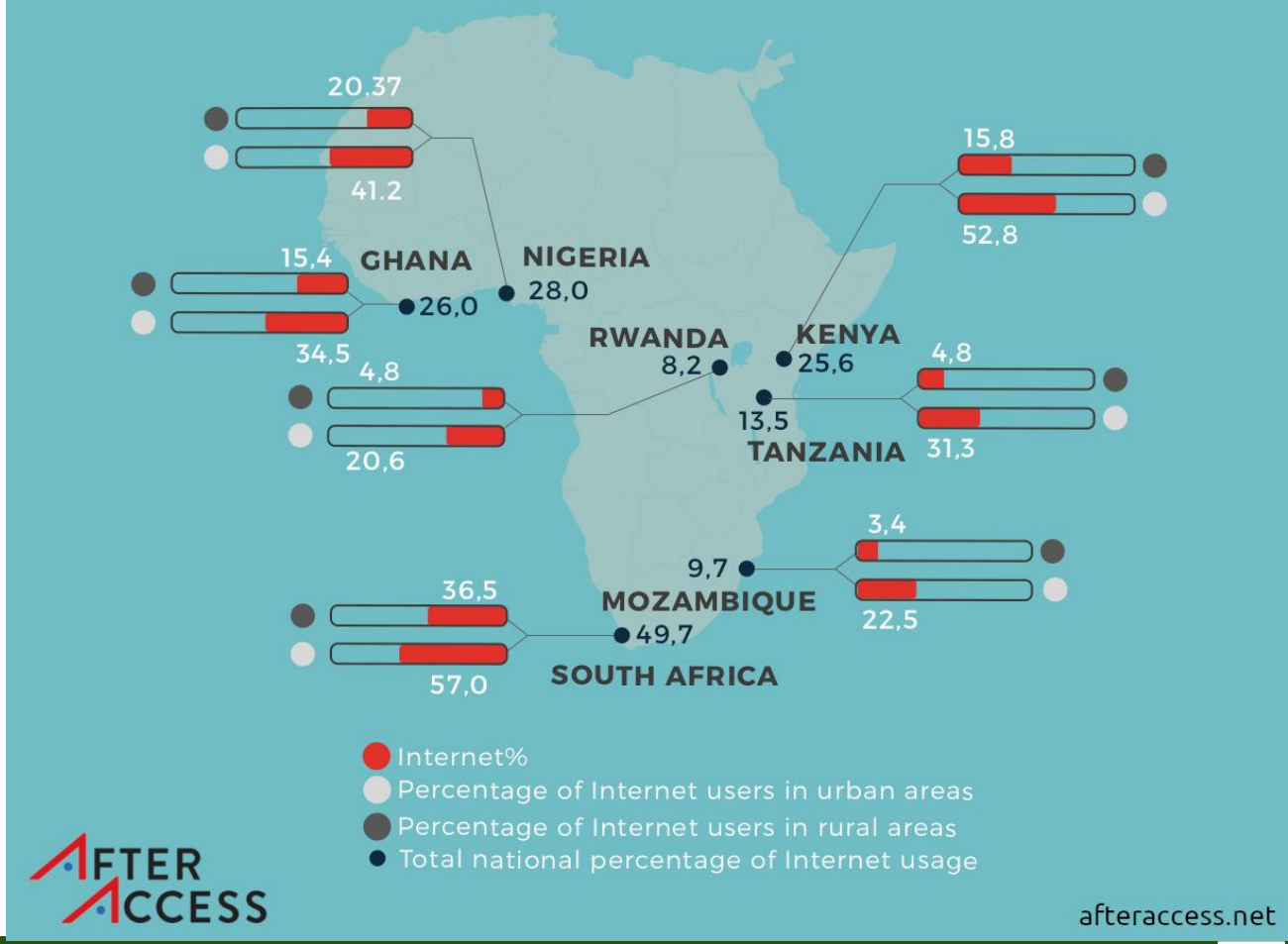
We've connected the relatively wealthy and urbanised

Billions of People on Earth	Average Annual Income	Affordable Monthly Communication Spend
1st Billion	$29,206	$205
2nd Billion	$12,702	$53
3rd Billion	$5,540	$23
4th Billion	$2,987	$12
5th Billion	$1,771	$7
6th Billion	$1,065	$4.4
7th Billion	$540	$2.25

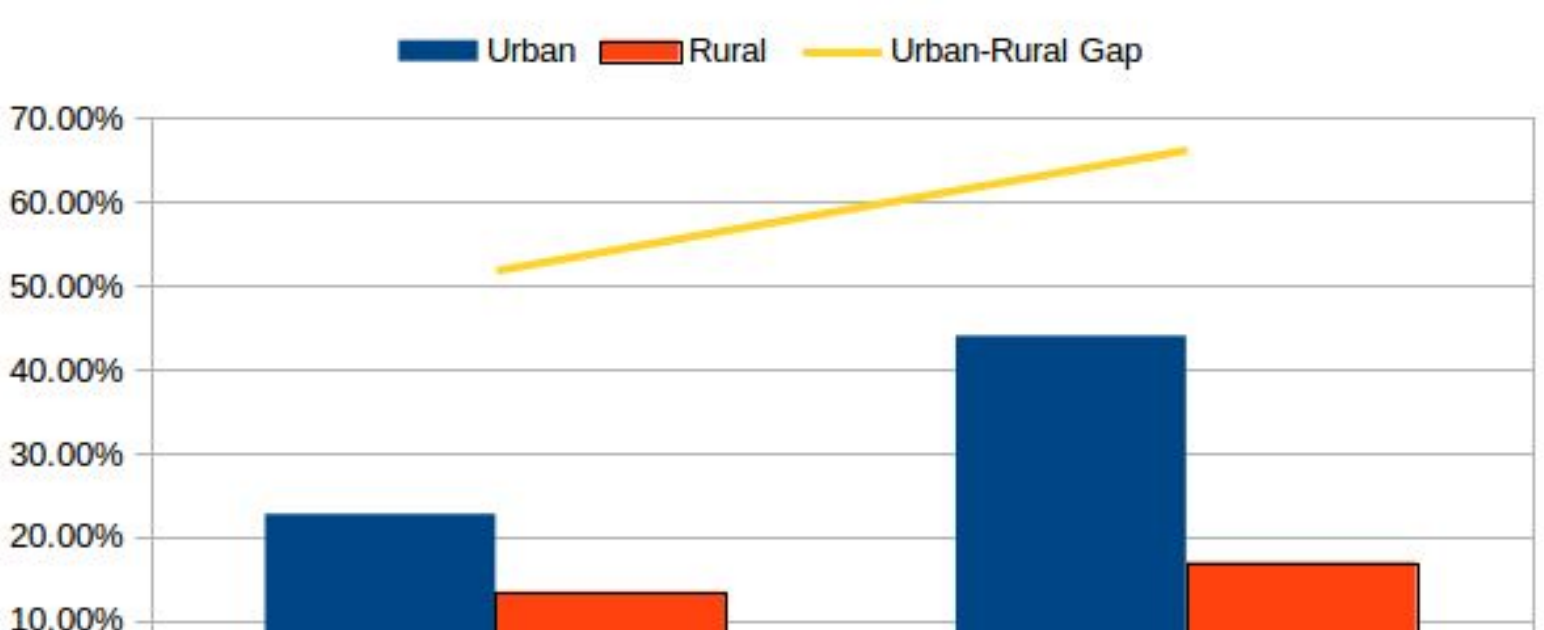
Source: Richard Thanki, University of Southhampton from UN & ITU data

Urban - Rural Divide

https://researchictafrica.net/wp/wp-content/uploads/2019/05/2019_After-Access_Africa-Comparative-report.pdf



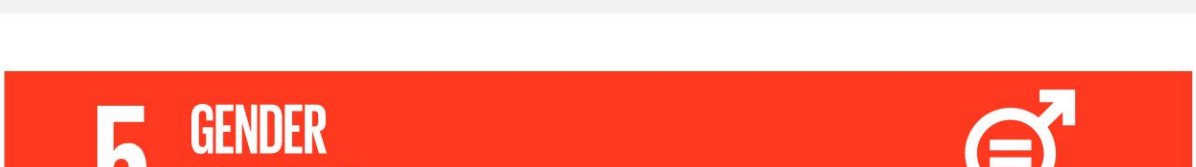
Evolution of Urban Rural gap in Africa



https://researchictafrica.net/wp/wp-content/uploads/2019/05/2019_After-Access_Africa-Comparative-report.pdf

Gender Gap

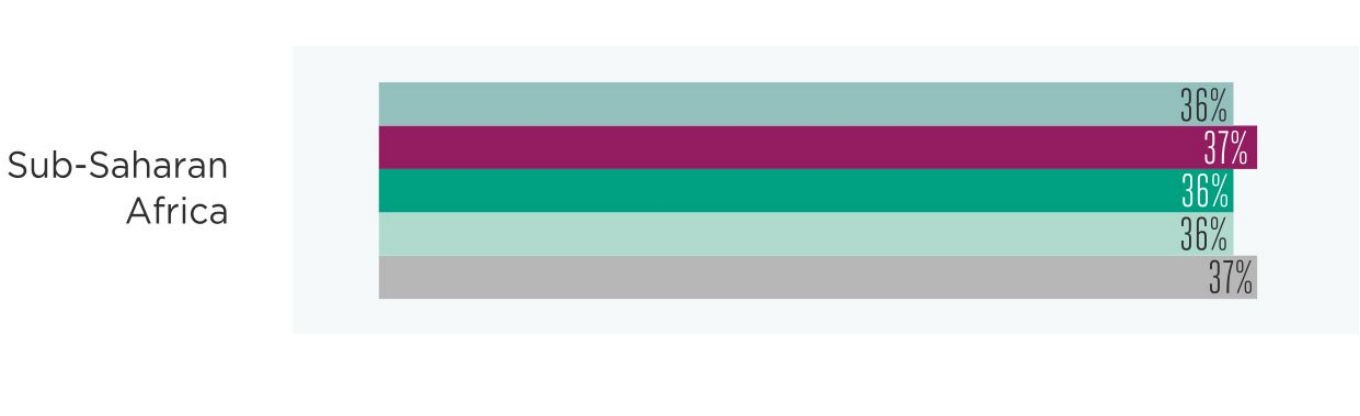
Goal 5: Achieve gender equality and empower all women and girls



5.B Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women

Source: https://www.un.org/sustainabledevelopment/gender-equality

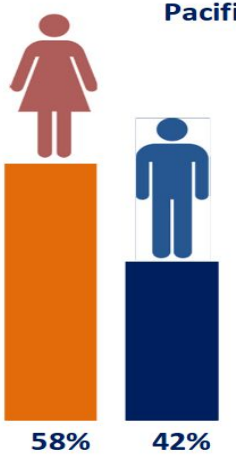
Gender Gap in Mobile Internet Use



https://www.gsma.com/r/wp-content/uploads/2022/06/The-Mobile-Gender-Gap-Report-2022.pdf

Source: "Working Together to Connect the World by 2020 – Reinforcing Connectivity Initiatives for Universal and Affordable Access", available from: www.broadbandcommission.org.

The Gender Gap is most pronounced in Africa, the Arab States and Asia-Pacific



Half have a GNI/capita of < US$ (PPP) 6,500, a large proportion of which are located in Africa and Asia-Pacific

60% live in rural areas, of which a large proportion is located in Africa and Asia-Pacific

The elderly have much lower Internet penetration levels than the overall population across all regions

Individuals with low educational attainment often remain unconnected across all regions

Source: Broadband Commission 2017

Universal Service and other Funds

COUNTRY	YEAR OF MOST RECENT REPORT	ESTIMATED UNSPENT FUNDS (US$ MILLION)
BENIN	2016	9.65
BOTSWANA	2016	14.02
BURKINA FASO (currently inactive and preparing for disbursements)	2016	77.71
CÔTE D'IVOIRE	2017	0.00
GHANA	2016	5.89
KENYA	2016	42.01
LIBERIA (currently inactive and preparing for disbursements)	2016	0.47
MADAGASCAR	2015	15.54
MOZAMBIQUE	2016	1.32
NIGERIA	2016	0.00
RWANDA	2016	0.00
SOUTH AFRICA	2016	10.00
UGANDA	2015	0.00
TOTAL		**176.6**

Source: A4AI Interviews with USAFs (2018), ECOWAS surveys (2017), and publicly available information.

Digital inequality is increasing in different dimensions with the current model

Complementary solutions are needed

WTDC 2022

RESOLUTION 37 (Rev. Kigali, 2022)

Bridging the digital divide

The World Telecommunication Development Conference (Kigali, 2022),

resolves to instruct the Director of the Telecommunication Development Bureau

15 to encourage innovation and accelerate the use and adoption of emerging digital technologies and the development of business models or other innovative ways to help telecommunication operators, as well as telecommunications/ICTs complementary access networks and solutions in reducing costs, overcoming geographic obstacles that leads to acceleration of digital inclusion to bridge the digital divide;

17 to continue supporting Member States, in the case where it is requested, in developing policy and regulatory frameworks that could expand and support the engagement of telecommunications/ICTs complementary access networks and solutions in bridging the digital divide;

14th Session ITU CWG-Internet

VIRTUAL MEETING - PHYSICAL OPEN CONSULTATION OF THE COUNCIL WORKING GROUP ON INTERNATIONAL INTERNET-RELATED PUBLIC POLICY ISSUES (CWG-INTERNET)

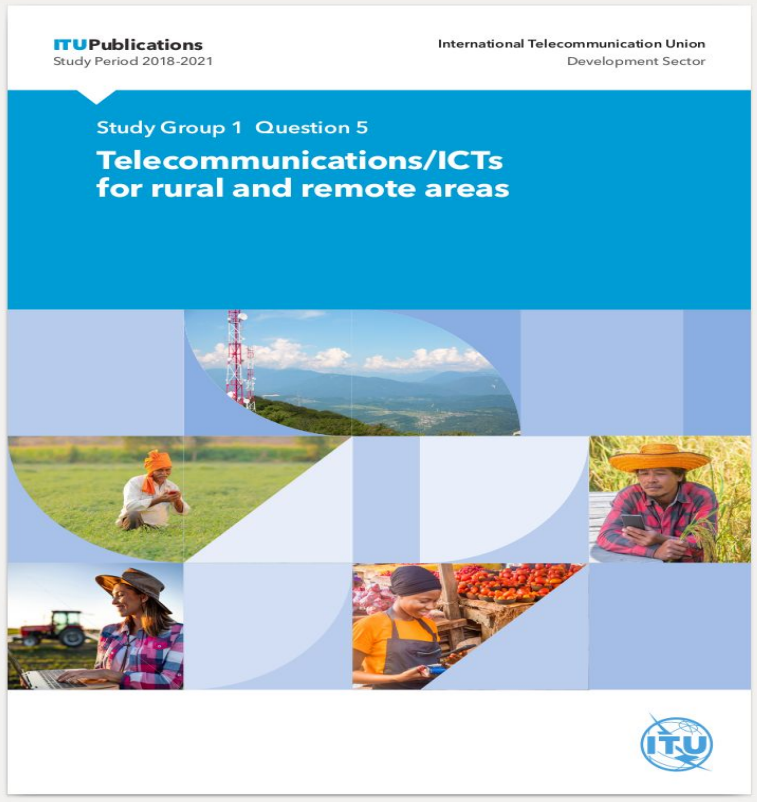
Brief Summary of the Online Open Consultation and Virtual Meeting - Physical Open Consultation (February 2020 – January 2021)

4.4 A number of policy issues related to expanding Internet connectivity were highlighted, including affordability, security and user trust, digital skills and capacity development, competition and innovation (including complementary access solutions such as community networks), investment, infrastructure, and spectrum management.

4.5 There was general consensus that a robust enabling environment is key to foster investment in the infrastructure, products and services that are critical to bridging the gaps in connectivity and affordable Internet access.

Stakeholders are invited to share and to implement as appropriate good practices in innovative and complementary access solutions that have been implemented in various regions, countries and local environments as a way to enhance connectivity.

ITU Study Groups



Lessons learnt

"Community Networks are an important part of connectivity ecosystems and they help bridge the digital divide"

Lessons learnt

- Community networks are an important part of connectivity ecosystems, and they help bridge the digital divide.

ITU Global Symposium for Regulators

Regulatory tools are at hand to bridge the funding and financing gap in digital markets

- Promote local innovation ecosystems and provide incentives for the participation of small and community operators in deploying low-cost rural networks, including specific licensing measures, access to key infrastructure and funding, and social coverage promotion programs.

Spectrum innovation is key for the digital future

- Adopt a multifaceted approach to freeing up additional spectrum in the low, mid, and high bands for a variety of business plans to successfully meet the need for additional network capacity while facing finite spectrum resources, including releasing spectrum for the establishment of community networks on a technology-neutral basis.

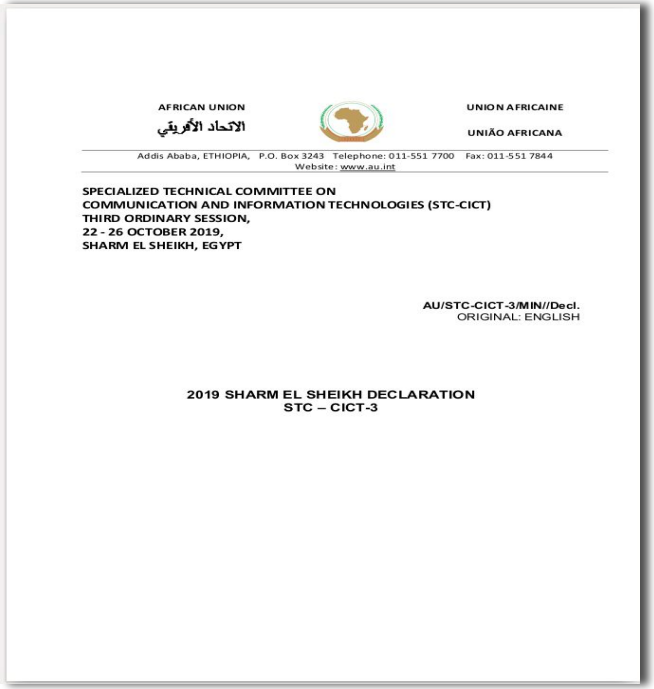
United Nations Secretary General

High Level Panel on Digital Cooperation

5. Recommendations

Second, investments should be made in both human capacity (see Recommendation 2 below) and physical infrastructure. Creating the foundation of universal, affordable access to electricity and the internet will often require innovative approaches, such as community groups operating rural networks, or incentives such as public sector support.

AU STC-CITC Declaration 2019



AFRICAN UNION
الاتحاد الأفريقي
UNION AFRICAINE
UNIÃO AFRICANA

Addis Ababa, ETHIOPIA, P.O. Box 3243 Telephone: 011-551 7700 Fax: 011-551 7844
Website: www.au.int

SPECIALIZED TECHNICAL COMMITTEE ON
COMMUNICATION AND INFORMATION TECHNOLOGIES (STC-CICT)
THIRD ORDINARY SESSION,
22 - 26 OCTOBER 2019,
SHARM EL SHEIKH, EGYPT

AU/STC-CICT-3/MIN//Decl.
ORIGINAL: ENGLISH

2019 SHARM EL SHEIKH DECLARATION
STC – CICT-3

"Promote the formulation of strategy and pilot projects for Unlocking Access to Basic Infrastructure and Services for Rural and Remote Areas including indigenous Community Networks..."

29. **PROMOTE** the formulation of strategy and pilot projects for Unlocking Access to Basic Infrastructure and Services for Rural and Remote Areas including Indigenous Community Networks, and develop guidelines on legislation on deployment of technologies and ICT applications, to accelerate infrastructure role out in collaboration with ATU and other regional institutions;

South Africa - Draft Spectrum Policy

GENERAL NOTICES • ALGEMENE KENNISGEWINGS

DEPARTMENT OF COMMUNICATIONS AND DIGITAL TECHNOLOGIES

GENERAL NOTICE 1271 OF 2022

ELECTRONIC COMMUNICATIONS ACT, 2005

(ACT NO. 36 OF 2005)

INVITATION TO PROVIDE WRITTEN SUBMISSIONS ON THE PROPOSED NEXT GENERATION RADIO FREQUENCY SPECTRUM FOR ECONOMIC DEVELOPMENT

21. Alternative Network Infrastructure

(a) To bridge connectivity gaps, extend broadband access and provide reliable data services for rural, remote and under-served communities including all low-income areas, and secondary cities and towns, this policy supports the "*development of alternative infrastructure*" such as Wi-Fi and Community Networks.

(b) The alternative network infrastructure deployment will also be used to prevent data market dominance by the oligopoly and to address transformation objectives.

September 8, 2022

21.2 Community Networks

(a) This spectrum policy acknowledges that the current market failure as reported in the State of Broadband Report 2021, "*in 2019, nearly 87 per cent of individuals in developed countries were using the Internet versus only 19 per cent in least developed countries (LDCs), as well as by households where nearly 89 per cent of households in developed economies were using the Internet versus less than 10 per cent in low-income countries*", can be addressed through supporting the viability of community networks.

(b) Given the inability of community networks to take off in South Africa, this policy adopts a variation of the implementation model of community networks to those led by SMMEs to allow the development of Mobile Virtual Network Operators (MVNOs), Internet Service Providers (ISPs), Wireless Access/ Internet Service Providers (WASPs/ WISPs) as competitive and viable data service providers.

(c) To address challenges that can impede the development of community networks including proliferation of these networks, the Regulator must develop a licensing framework for Community Networks in a manner that allows participation of new entrants, commercial viability, geographic spread of participants.

(d) The Regulator must, within a year from publication of this spectrum policy, investigate and report with recommendation(s) to Minister, a new licensing framework for community network built, services, access and licensing fees or exemptions that can be implemented to ensure proliferation and success of community networks.

(e) The Regulator must continuously identify and streamline or eliminate regulatory requirements that may impede the commercial viability and sustainability of community networks.

Community Networks in Africa

Economics of Affordable Access

Law of Amplication

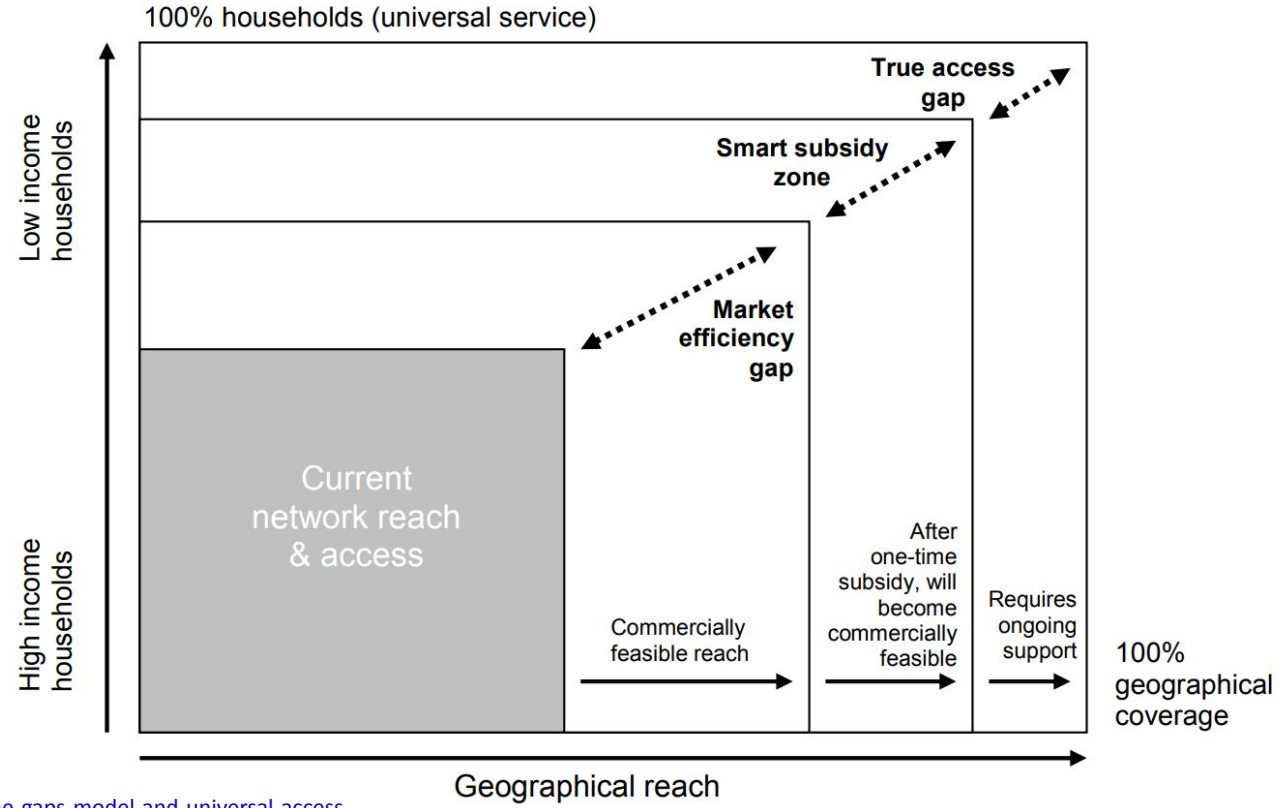
"Technology is a tool; it amplifies existing human capacities. This means that if anything, indiscriminate dissemination of digital technology tends to aggravate inequalities.

Technology helps only when there is firm intention economically, politically, culturally to push against the gradient of inequality."

~ Kentaro Toyama

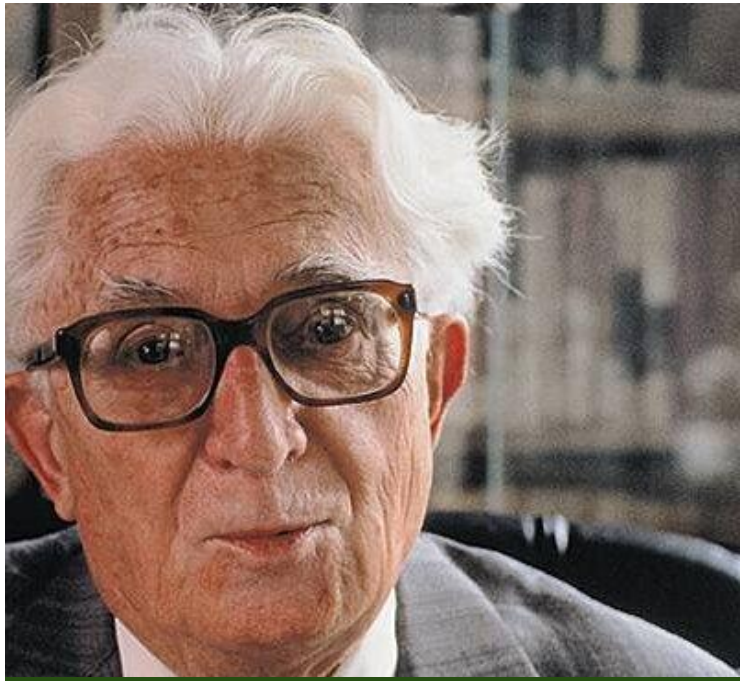
https://cacm.acm.org/magazines/2016/4/200163-the-internet-and-inequality/fulltext

Access Gap Model - 2002



http://blogs.worldbank.org/ic4d/the-gaps-model-and-universal-access

Fernand Braudel - No Single Economy



Fernand Braudel

Global Economy
Large companies, financial institutions, the State: serves global markets

Local Market Economy
Small businesses, self-employment: serves local needs

Non-Market Economies
Few market economy activities and mainly informal activities: serves a subsistence economy

Global Economy	Local Market Economy	Non Market Economy
Large companies, financial institutions, the State: serves global markets	Small businesses, self-employment: serves local needs	Few market economy activities and mainly informal activities: serves a subsistence economy

Jar of Stones - a metaphor

https://www.flickr.com/photos/automotocycle/7580595984/

Small & Medium Enterprises (SMEs) expected to contribute 50% to Kenya's GDP

There is an opportunity to unlock the potential of small network operators through the creation of an enabling regulatory ecosystem

https://www.capitalfm.co.ke/business/2022/06/kenyan-smes-projected-to-contribute-50pc-of-gdp-in-next-three-years/

Global Economy

MTN Operations in Africa

Uganda (96%)‡
No 1 operator
55,9% market share
Population 42,9 million
EBITDA R1,8 billion**
Contribution to group EBITDA 4%
Capex R0,9 billion**
Subscribers#
10,7 million
Data revenue*
up 41,1%
(10% of revenue)

Cameroon (70%)‡
No 1 operator
53,7% market share
Population 24,1 million
EBITDA R1,3 billion**
Contribution to group EBITDA 3%
Capex R1,0 billion**
Subscribers#
7,1 million
Data revenue*
up 21,1%
(15% of revenue)

Ivory Coast (59%)‡
No 2 operator
33,8% market share
Population 24,3 million
EBITDA R2,3 billion**
Contribution to group EBITDA 5%
Capex R1,2 billion**
Subscribers#
10,9 million
Data revenue*
up 87,5%
(10% of revenue)

South Africa (100%)‡
No 2 operator
31,2% market share
Population 56,7 million
EBITDA R14,4 billion**
Contribution to group EBITDA 33%
Capex R11,5 billion**
Subscribers#
29,5 million
Data revenue*
up 25,0%
(33% of revenue)

Nigeria (79%)‡
No 1 operator
42,1% market share
Population 190,9 million
EBITDA R14,0 billion**
Contribution to group EBITDA 32%
Capex R9,0 billion**
Subscribers#
52,3 million
Data revenue*
up 86,6%
(12% of revenue)

Ghana (98%)‡
No 1 operator
55,1% market share
Population 28,9 million
EBITDA R4,1 billion**
Contribution to group EBITDA 9%
Capex R2,2 billion**
Subscribers#
15,7 million
Data revenue*
up 50,6%
(25% of revenue)

MTN Group 2022 EBITDA margin

45.3%

https://africa.businessinsider.com/local/markets/mtn-group-half-year-2022-financial-statements/vgq8hwl

Statements of Profit or Loss and other Comprehensive Income

	Notes	GROUP 2022 KShs'm	GROUP 2021 KShs'm	COMPANY 2022 KShs'm	COMPANY 2021 KShs'm
Revenue from contracts with customers	5(a)	**295,441.4**	261,462.3	**292,556.2**	259,296.3
Revenue from other sources	5(b)	**2,636.5**	2,564.2	**3,289.7**	3,153.4
Total revenue		**298,077.9**	**264,026.5**	**295,845.9**	**262,449.7**
Direct costs	6(a)	**(91,467.8)**	(80,852.8)	**(90,613.6)**	(80,334.1)
Expected credit losses on financial assets	6(b)	**(2,361.2)**	(3,009.7)	**(2,602.7)**	(3,863.7)
Other expenses	7	**(55,187.0)**	(46,034.8)	**(49,545.5)**	(45,168.6)
Earnings before interest, taxes, depreciation and amortisation (EBITDA)		**149,061.9**	**134,129.2**	**153,084.1**	**133,083.3**
Depreciation of property and equipment	18	**(34,145.2)**	(32,624.5)	**(33,922.2)**	(32,570.4)
Amortisation – Indefeasible rights of use (IRUs)	19	**(281.3)**	(406.5)	**(281.3)**	(406.5)
Amortisation – Intangible assets	21	**(1,850.0)**	(1,628.5)	**(1,850.0)**	(1,628.1)
Amortisation – Right-of-use (RoU) assets	22(a)	**(3,656.8)**	(3,304.8)	**(3,644.2)**	(3,304.8)
Operating profit		**109,128.6**	**96,164.9**	**113,386.4**	**95,173.5**
Finance income	8	**2,413.4**	2,198.4	**2,050.1**	2,177.0
Finance costs	9	**(8,852.6)**	(4,220.8)	**(8,895.2)**	(4,405.5)
Share of loss of associates	23(b)	**(279.8)**	(192.9)	**(279.8)**	(192.9)
Share of loss of joint venture	23(b)	**(196.2)**	(314.1)	**(196.2)**	(314.1)
Profit before income tax		**102,213.4**	**93,635.5**	**106,065.3**	**92,438.0**
Income tax expense	12(a)	**(34,717.3)**	(24,959.3)	**(34,276.0)**	(24,481.4)
Profit for the year		**67,496.1**	**68,676.2**	**71,789.3**	**67,956.6**

EBITDA Margin

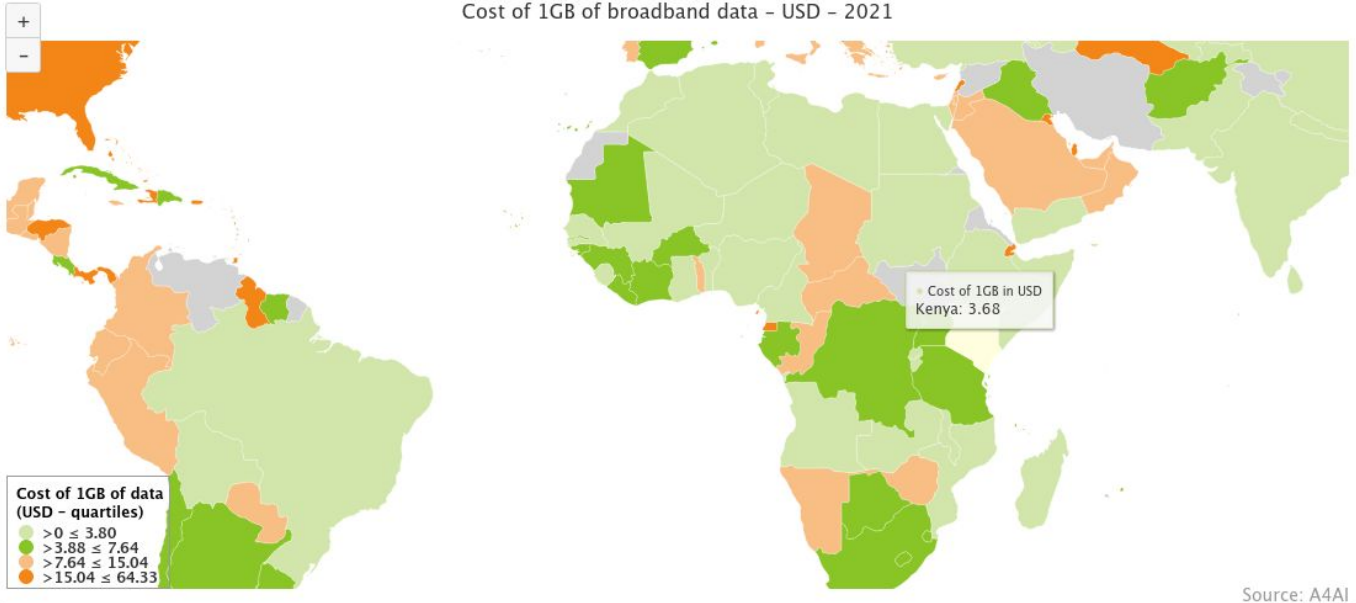
$$\frac{153084.1}{295845.9} = 51.75\%$$

Safaricom Financial Results 2022
https://www.safaricom.co.ke/annualreport_2022/

	Units	Q1 FY23	Q1 FY22
Africa mobile customers[2]	million	185.7	181.6
Africa data users[2]	million	88.0	87.2

Source: Vodacom's Annual Results Q1 2022

Cost of 1GB Broadband Data

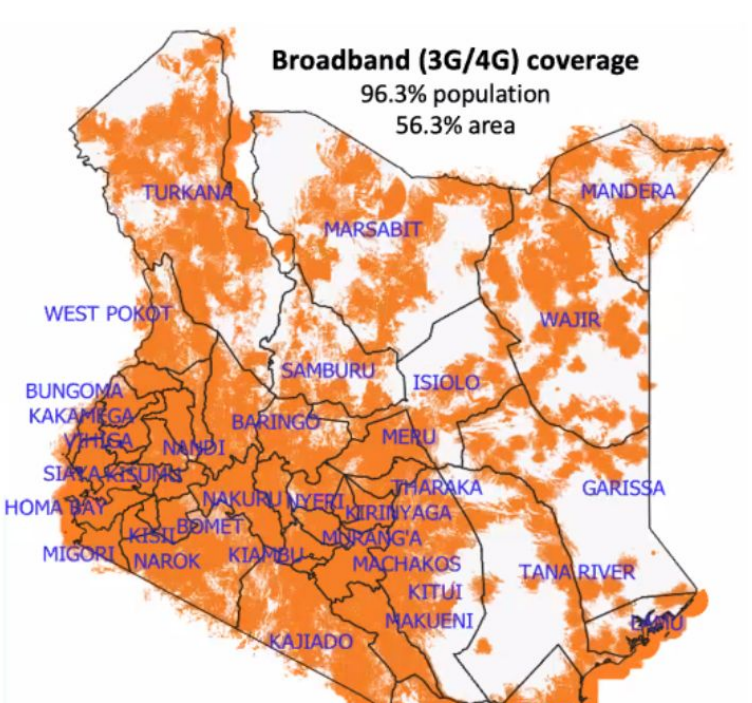


kenya

Countries	100MB USD	500MB USD	1GB USD	2GB USD	5GB USD	10GB USD
Kenya	1.30	2.32	**3.68**	4.64	9.28	18.57

https://a4ai.org/a4ai-2021-mobile-broadband-pricing-usd/

Access gaps of Global Economy

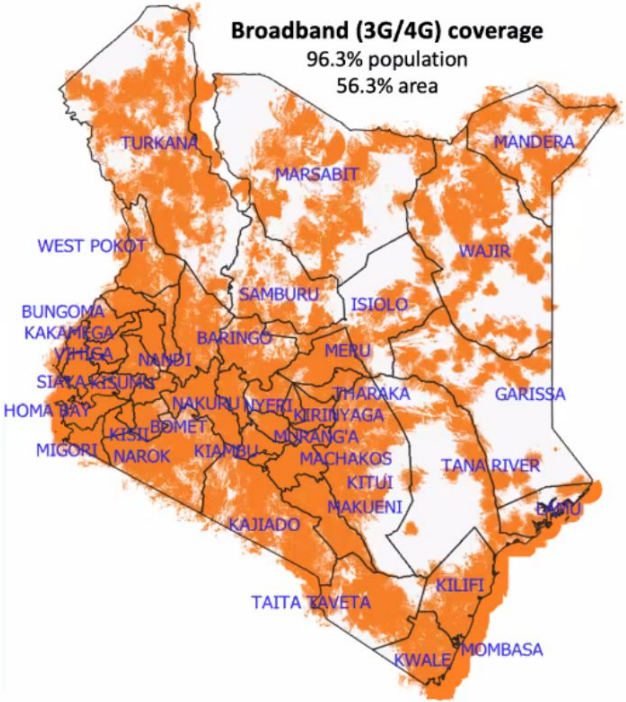


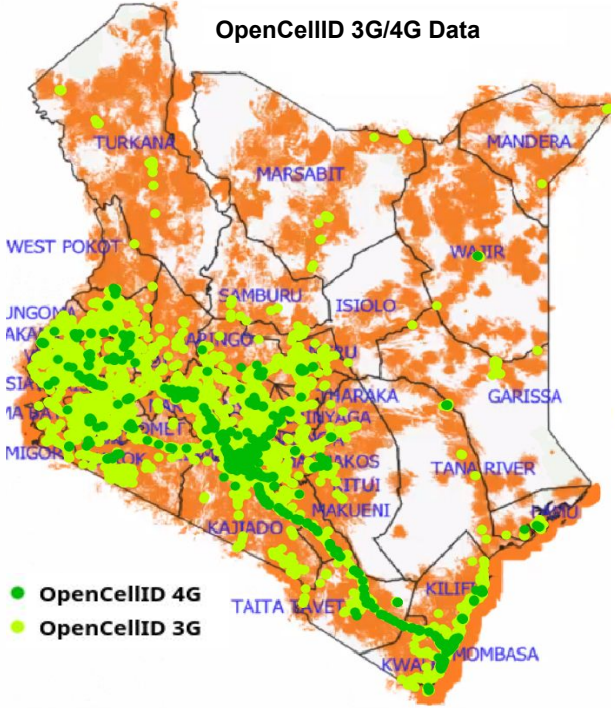
"In 2021, Safaricom Kenya reported that of its 20 million active data customers, half used less than 100 MB per month."

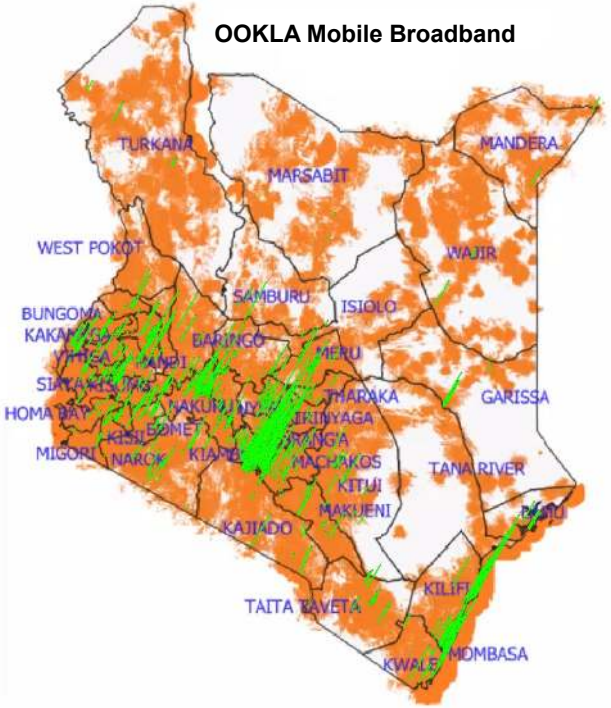
"In May 2022, Airtel Africa reported that 80% of its data traffic is driven by 4G, which accounts for only 20% of its devices."

GSMA - The State of Mobile Connectivity 2022

Unpacking coverage







ISP and CN Competitiveness

- ISPs and CNs play a critical role in differentiating services e.g. uncapped fixed wireless services vs metered PAYG services

- ISPs and CNs are also typically closer to their customers and better able to understand the specific barriers that hold back uptake in their region

Non-Market Economy

- Municipal Networks (Public WiFi)
- Community Centres
- Public Access (Libraries)
- Intranets
- Telecommunication Cooperatives
- Community Networks

Benefits of Community Networks

"In Africa, a community network is not simply telecommunications infrastructure deployed and operated by citizens to meet their own communication needs; it is a tool to improve what a community is already doing in terms of their growth and development, by contributing to a local ecosystem that enhances the daily lives of those staying in the community."

- More local control over how the network is used and the content that is provided over the network.
- Greater potential for attention to the needs of marginalised people and the specific populations of rural communities, including women and older people.
- Lower costs and retention of more funds within the community.
- Increased potential to foster a sense of agency and empowerment among users and those involved in the network

Source: Understanding Community Networks in Africa
https://www.internetsociety.org/resources/doc/2017/supporting-the-creation-and-scalability-of-affordable-access-solutions-understanding-community-networks-in-africa/

Community Networks in Africa

African Community Network Summit 2019 in Dodoma, Tanzania

- About 42 initiatives
- 14 African countries
- Mostly concentrated in East and South Africa
- Beyond connectivity they offer digital literacy training for communities
- Promote local content development
- Help catalyse local economies

https://www.internetsociety.org/resources/doc/2017/supporting-the-creation-and-scalability-of-affordable-access-solutions-understanding-community-networks-in-africa/

Barriers to Community Networks

Barriers and international good practice regarding:

- Operator Licensing
- Spectrum Licensing and Fees
- Backbone and backhaul Infrastructure
- Financial support
- Access to network information

Kenya

Community Network Operator License (2021)

Unified License Framework

The Authority has in place a Unified Licensing Framework (ULF), which is technology and service neutral. The ULF market is structured into three main licenses:

1. Network Facilities Provider.
2. Application Service Provider.
3. Content Service Provider.

National Network Facilities Provider
For deployment of infrastructure nationally
- **Tier 1** - Annual fee: the higher of 0.4% of turnover or Ksh 4M (USD 37K) National
- **Tier 2** - Annual fee: the higher of 0.4% of turnover or Ksh 800K (USD 7500) Regional
- **Tier 3** - Annual fee: the higher of 0.4% of turnover or Ksh 160K (USD 1500) County
- **Community Network Operator License (KSh 5,000 per year)**

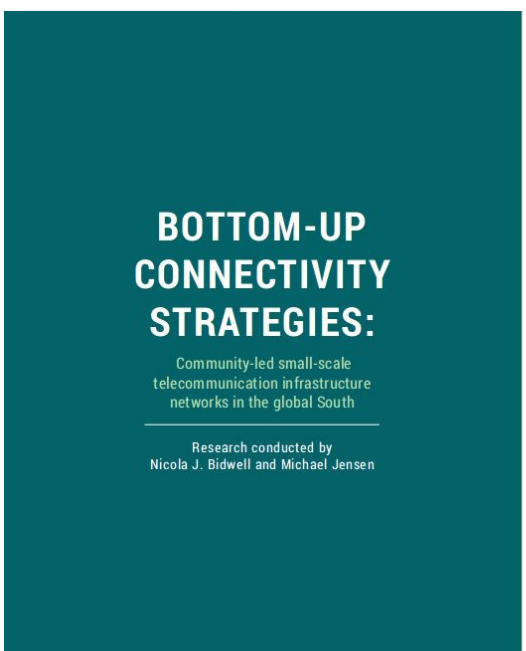
International Network Facilities Provider
- Submarine Cable Landing License
- International Gateway License

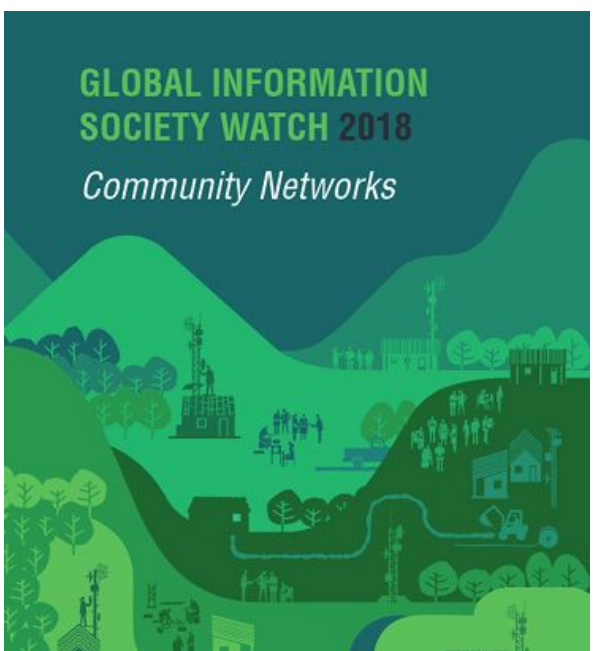
Non-Infrastructure Based Service Providers
- Application Service Provider (Includes MVNOs, Vehicle Tracking, ccTLDs)
- Content Service Provider
- Electronic Certification Service Provider

Terminal Equipment Providers
- Telecom Terminal Equipment Contractors
- Telecommunications Technical Personnel

Private Very Small Aperture Terminal (VSAT)

https://www.ca.go.ke/wp-content/uploads/2021/10/Community-Network-and-Service-Provider-CNSP-License.pdf





https://www.apc.org/connectivitystrategies

https://www.giswatch.org/community-networks